

## B. Dual Use Science and Technology Program



The ability of the United States to retain technological superiority on future battlefields will, in many cases, depend on the Nation's ability to take advantage of technological advances occurring in commercial industry. Commercial technology developments in areas such as electronics, advanced computing, communications, and medical research, are racing forward. These commercial developments are funded at levels vastly exceeding what the Department is currently able to apply. Greater reliance on commercial technologies not only will provide the Defense Department access to advances in technologies occurring in the commercial sector but also allows the Department to take advantage of the competitive pressures and market-driven efficiencies inherent in the commercial sector. This competitive, market-driven approach will increase the pace at which technological improvements are incorporated into defense systems while at the same time, reducing the costs of those systems.

The Department of Defense's (DoD) Dual Use Science and Technology (DU S&T) Program is designed to help the Department incorporate commercial technologies into defense systems. The Program was established in the Fiscal Year 1998 Defense Authorization Act and has two primary goals. The first is to jointly fund and develop dual use technologies with industry. To support this goal, the Act provides for 50/50 government/industry cost share of development. Other incentives for industry to work with DoD's DU S&T Program, besides the 50 percent project cost share by the government, include: access to technology from the government, and increased market opportunities with the Military Services. In addition to these business incentives, the Department is making it easier for commercial companies to enter into agreements with the DoD by using procedures that are not subject to most of the Federal procurement laws and regulations. These procedures, known as "Technology Investment Agreements," which include "Other Transactions" and "Cooperative Agreements," offer a great deal more flexibility and fewer regulatory requirements than standard government contracting. The use of alternative procedures provides the Department the ability to attract many commercial firms that would not otherwise do business with the DoD. The second goal is to make the development of dual use technologies with industry a normal way of doing business within the Services. The Fiscal Year 1998 Authorization Act established goals for the initiation of dual use projects. These goals started at 5% of each Department's applied research program in Fiscal Year 1998 and grew to 15% by 2001.

Thus far, more than 400 companies, universities, and nonprofits are participating in the Program. 327 DU S&T projects were initiated with a total value of over \$1.0 billion. In addition to the growing size of investments, it is encouraging to see the number of commercial firms that have become involved in the Program. These firms are bringing many new ideas to the table. Service participation in the DU S&T Program has been key to the Program's success. Now, execution of the Program is transitioning

from OSD to the Services. A sixth solicitation for Fiscal Year 2002 proposals was issued in April 2001 and closed at the end of July 2001. Approximately \$60 million in government funding (\$30 million Service DU S&T and \$30 million Service field funds) are anticipated to form new partnerships with industry and to bring commercial technology development to the benefit of the Department. As with the previous solicitation, this was a joint solicitation issued by the Air Force and was used as a vehicle to launch an extensive outreach effort to industry.

### **Dual Use Science and Technology Achievement Award**

In FY 2000, the Deputy Under Secretary of Defense for Science and Technology established an annual Dual Use Science and Technology Achievement Award to recognize successful dual use projects and honor those individuals responsible for their initiation and execution. Winning projects are selected by committee based on military benefit, commercial viability, and quality of cost share. The responsible individuals identified from the winning project received a \$5,000 award, and the two runners-up each received \$2,500.

The following three projects were the winners and runners-up for the 2000 DU S&T Achievement Award. These projects highlight the success DU S&T is seeing in partnering with industry to leverage our scarce S&T dollars to develop the best technology available for both defense and commercial application.

### **Electronically Controlled Active Braking System for Medium Duty Vehicles**

Mr. Brad McNett, Program Manager, and Mr. Mark A. Mushenski, Project Engineer, of the Army's National Automotive Center, Tank-Automotive and Armaments Command shared first prize for their work with Continental Teves in developing an electronically controlled active braking system (ABS) for medium duty vehicles. The project resulted in an affordable ABS that will be used on the Army's HMMWVs and on medium class commercial trucks to improve safety and performance. The project involved developing and integrating the MK50 ABS with low speed traction control on a M1097A2 HMMWV. The project successfully advanced the state-of-the-art for ABS for commercial vehicles while including the unique needs of the HMMWV early in the development cycle. As a result of this project, Continental Teves had commercial orders for more than 50,000 units per year in 2001. In addition, Continental Teves was selected as the brake supplier for the next generation HMMWV, the A4. Production of the A4 is expected to begin in 2003 and volumes are projected to be 3,000 to 5,000 vehicles per year. The expected ABS acquisition cost for the A4 is \$500 to \$700 per unit compared to approximately \$2,500 per vehicle without a commercial production base. This will reduce A4 acquisition costs by more than \$50 million.

### **Renewal of Legacy Software Systems (ROLSS)**

The first runner-up award was presented to Mr. Charles Caposell, electronics engineer, at the Navy's Air System Command, Patuxent River, Maryland. Mr. Caposell

worked with CPU Technology of Pleasanton, California to develop a process to update aging and obsolete hardware without requiring the costly rewrite and validation of already proven software. The project resulted in a family of configurable processor frameworks called CFrame that allows processors and systems-on-chips to be quickly and cost-effectively configured to any given instruction set. The CFrame family offers a range of performance, up to an industry leading five billion instructions per second, 256-bit framework, the fastest in the world. One version of the CFrame is being used in a Programmable Display Generator for the F-16 and is saving tens of millions of dollars according to the F-16 program office. A CFrame is also being used to modernize the F-16's fire control radar with projected savings of \$150 million. The overall savings from the project are estimated at up to \$1 billion over the next decade. CPU Technology is actively participating in discussions with commercial aerospace companies to identify commercial applications of the technology.

### **Future Air Navigation and Traffic Avoidance through Integrated Communications, Navigation and Surveillance (FANTASTIC)**

The second runner-up award was presented to Mr. Joel Arnold, project engineer, of the Air Force Research Laboratory at Wright Patterson Air Force Base. Mr. Arnold worked with Rockwell Collins to develop a cost-effective solution for upgrading tactical fighters, general aviation aircraft and business jets to meet future FAA regulations. These regulations will require that all aircraft be capable of reporting their GPS position, altitude, heading and air speed over SATCOM, have collision avoidance capability, and send, receive and display English text via a data link. This project successfully demonstrated an effective solution to meet these requirements. The system developed overcame the space restraints on tactical fighters and the cost restraints of the commercial general aviation and business jet market to develop a true dual use technology. The technology is planned for use on the F-22 and will result in an acquisition saving of over \$100M. It is also expected to be the technology of choice on the Comanche helicopter with similar cost savings, and is being considered for the Joint Tactical Radio System and the Joint Strike fighter. Rockwell Collins will be expanding into the huge (over 1,000,000) general aviation, and personnel aircraft market, which will reduce the cost to the DoD through economies of scale.